RAMAN LABELLED ANTIBODY/APTAMER BASED IMMUNOASSAY FOR THE DETECTION OF OVARIAN CANCER BIOMARKER CA125.

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Epithelial ovarian cancer (EOC) is one of deadliest cancers among women, ranking as the 5th leading cause for cancer related deaths in women in the United States. The higher mortality can be linked to the poor ability to diagnose this type of cancer at an early, treatable stage due to the lack of sensitivity and specificity in the methods that have been clinically used. Therefore, developing new techniques that can identify individuals who are at the treatable or early stage is important to increase the survival rate. Spectroscopic aided bio-conjugation technique is one such technique that could potentially alleviate some of the problems associated with the current clinical methods. In this immunoassay method, we conducted two separate investigations into the individual affinities of an antibody and an aptamer towards the ovarian cancer biomarker CA125 aided by gold nanoparticles (AuNPs) pre-modified with a Raman marker and evaluate the sensitivity of each aptamer or antibody based assay. For this goal, we used Ni-NTA (Nickel-nitrilotriacetic acid) micro particles (magnetic beads) to sandwich and purify the CA125-antibody or aptamer complex labelled with Raman markers. Firstly, Ni-NTA magnetic beads were conjugated to CA125 through histidine (CA125 His-tag). It was then incubated with a biotinylated antibody or aptamer. Finally, the conjugate was labelled by streptavidin coated AuNPs, which are pre-modified with a Raman marker. Following the magnetic separation, the final conjugates were investigated with surface enhanced Raman spectroscopy. The Raman signatures from the label verified the purification of the CA125-antibody or CA125-aptamer complex sandwiched by magnetic beads and AuNPs.